

## OCEAN GALES AND STORMS, MARCH 1934—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN—Continued													
Ala, Am.S.S.	Rotterdam	Boston	50 22 N.	23 10 W.	Mar. 14	2a, 14	Mar. 17	Inches 29.20	NW	NW, 6	WNW	W, 10	None.
Noreg, Nor.M.S.	Oslo	Colon	50 03 N.	3 55 W.	do.	Noon, 14	do.	28.99	WSW	SW, 10	WNW	NW, 12	None.
Tuscarora, Br.S.S.	Manchester	Baton Rouge	52 03 N.	6 35 W.	do.	3p, 14	do.	28.66	W	W, 8	NW	WNW, 11	S-W.
Solana, Am.S.S.	Fall River	Curacao	37 05 N.	70 24 W.	Mar. 15	7p, 15	Mar. 15	29.66	W	WNW, 10	NW	WNW, 10	S-W-NW.
City of Havre, Am.S.S.	Havre	Norfolk	49 35 N.	27 58 W.	do.	Mdt. 15	Mar. 17	29.21	NW	S, 11	NNW	S, 11	SW-S-W.
Scanyork, Am.S.S.	Copenhagen	New York	55 30 N.	27 30 W.	Mar. 16	2a, 16	Mar. 16	28.86	W	NW, 7	NW	NW, 11	NW-W.
Volendam, Du.S.S.	Rotterdam	Halifax	49 52 N.	15 43 W.	do.	2a, 17	Mar. 17	28.42	W	WSW, 10	NW	NW, 10	WSW-NW.
Minnie de Larrinaga, Br.S.S.	Galveston	Liverpool	49 15 N.	16 00 W.	Mar. 15	do.	do.	28.79	SSW	NW, 12	NW	WNW, 12	W-WNW.
Independence Hall, Am.S.S.	New York	Havre	48 24 N.	17 23 W.	Mar. 13	3a, 17	do.	28.99	WNW	W, 10	NW	WNW, 11	W-WNW.
American Banker, Am.S.S.	do.	London	48 18 N.	18 36 W.	Mar. 15	do.	do.	29.39	SW	NW, 10	NW	WNW, 11	WNW-NW.
Steel Age, Am.S.S.	Cristobal	Liverpool	50 15 N.	13 22 W.	Mar. 16	4a, 17	do.	28.40	WNW	W, 8	NW	W, 9	SW-W-NW.
City of Havre, Am.S.S.	Havre	Norfolk	48 30 N.	33 00 W.	Mar. 17	Mdt., 17	Mar. 18	29.28	W	W, 8	WNW	W, 11	SW-W.
Berlin, Ger.S.S.	New York	Galway	48 05 N.	42 20 W.	do.	10a, 18	Mar. 19	29.65	WNW	WNW, 11	NW	WNW, 11	Steady.
Volendam, Du.S.S.	Rotterdam	Halifax	48 55 N.	27 20 W.	Mar. 18	1a, 19	do.	28.73	W	WNW, 11	NW	NW, 11	W-NW.
Tuscarora, Br.S.S.	Manchester	Baton Rouge	45 22 N.	19 02 W.	do.	3a, 19	do.	29.18	W	NW, 9	NW	W, 11	SW-NW.
Lochmonar, Br.M.S.	London	Cristobal	46 40 N.	10 32 W.	Mar. 19	4a, 19	Mar. 20	28.89	W	W, 7	NNW	NW, 11	W.
Washington, Am.S.S.	New York	Cohb	49 30 N.	23 40 W.	Mar. 17	6a, 19	Mar. 19	28.59	WNW	WNW, 9	NNW	WNW, 10	WNW-NW.
Cuba, Fr.S.S.	Cristobal	Havre	43 30 N.	13 47 W.	Mar. 19	2p, 20	do.	29.42	SSW	WSW, 10	WSW	WSW, 10	WSW-WNW.
San Juan, Am.S.S.	Puerto Rico	New York	36 40 N.	72 40 W.	Mar. 20	4p, 20	Mar. 20	29.12	NE	NE, 9	NNE	NE, 10	Steady.
Sarcosie, Am.S.S.	Bordeaux	do.	39 26 N.	51 50 W.	Mar. 21	2a, 22	Mar. 22	29.56	S	SSW, 9	NNW	SSW, 10	S-SSW-WNW.
Solana, Am.S.S.	Curacao	Fall River	23 35 N.	69 00 W.	Mar. 25	4p, 25	Mar. 25	30.06	NE	ENE, 8	E	ENE, 8	NE-ENE.
Ensley City, Am.S.S.	Cristobal	Philadelphia	31 41 N.	79 10 W.	Mar. 29	7p, 28	Mar. 30	29.99	NE	NNE, 6	NNE	NNE, 9	None.
Breedyk, Du.S.S.	Rotterdam	New York	48 18 N.	28 45 W.	do.	11p, 29	Apr. 1	29.20	W	NNW, 11	N	NNW, 11	NW-NW.
City of Joliet, Am.S.S.	do.	Tampa	39 55 N.	23 55 W.	Mar. 28	8a, 30	Mar. 31	29.71	NNW	NW, 9	NW	NW, 9	None.
NORTH PACIFIC OCEAN													
Grays Harbor, Am.S.S.	Seattle	Yokohama	51 09 N.	139 22 W.	Mar. 1	10a, Mar. 1	Mar. 1	28.70	S	SSW, 12	W	SSW, 12	SSW-SW-W.
Kwanto Maru, Jap.M.S.	Yokohama	Los Angeles	46 30 N.	176 25 W.	Mar. 4	11p, 4	Mar. 5	29.33	E	E, 9	NE	ENE, 9	E-ENE-NE.
Bengalen, Du.M.S.	Manila	Vancouver	42 28 N.	156 00 E.	Mar. 6	6a, 6	Mar. 6	29.44	NW	NW, 9	WNW	NW, 9	NW-WNW.
Tahchee, Br.S.S.	Shanghai	Los Angeles	39 54 N.	164 26 E.	do.	Noon, 6	Mar. 8	29.34	W	W, 10	WNW	W, 10	Steady.
Grays Harbor, Am.S.S.	Seattle	Yokohama	52 00 N.	161 00 W.	do.	8p, 6	Mar. 6	28.71	E	ESE, 7	E	ENE, 10	E-ESE.
Fernbrook, Nor.M.S.	Port Alberni	do.	52 15 N.	167 54 W.	do.	1a, 7	do.	28.70	NE	ESE, 3	NE	NE, 10	NE-ESE.
Bengalen, Du.M.S.	Manila	Vancouver	45 00 N.	173 30 E.	Mar. 7	11p, 8	Mar. 8	29.30	NNW	NW, 3	NW	NW, 8	None.
San Pedro, Jap.M.S.	Yokohama	Los Angeles	39 00 N.	150 08 E.	Mar. 9	1a, 10	Mar. 10	29.22	W	WNW, 5	N	W, 10	W-WNW-N.
Laertes, Du.S.S.	Los Angeles	Kobe	28 52 N.	151 22 E.	Mar. 10	4p, 10	Mar. 11	29.99	WNW	WNW, 7	N	NNW, 10	None.
Pres. Jackson, Am.S.S.	Yokohama	Yokohama	49 48 N.	175 00 E.	Mar. 12	8p, 10	Mar. 12	29.11	N	NW, 4	NNE	N, 8	WNW-NW-N.
Willkeno, Am.S.S.	Los Angeles	Balboa	14 20 N.	95 45 W.	Mar. 11	4p, 11	do.	29.84	NE	NNE, 9	N	NNE, 9	None.
Pres. Hoover, Am.S.S.	Honolulu	San Francisco	31 47 N.	139 00 W.	Mar. 12	4p, 12	do.	29.66	WNW	N, 1	WNW	WNW, 9	W-N-NNE.
Laertes, Du.S.S.	Los Angeles	Kobe	32 26 N.	135 13 E.	Mar. 13	3a, 14	Mar. 13	29.64	SE	NNW, 7	W	SSE, 9	NE-N.
Nevadan, Am.S.S.	do.	Balboa	14 40 N.	95 15 W.	do.	4a, 14	Mar. 14	29.84	NE	NNE, 8	NNW	N, 8	NE-N.
Pres. Jackson, Am.S.S.	Victoria	Yokohama	39 20 N.	146 20 E.	Mar. 14	2p, 14	Mar. 15	29.21	ESE	SE, 8	NW	SE, 9	SE-NW-N.
Pres. Grant, Am.S.S.	Yokohama	Seattle	46 12 N.	167 05 E.	Mar. 12	4p, 14	Mar. 14	29.46	NNW	NW, 10	WNW	NW, 10	NW-W.
American, Am.S.S.	Balboa	Los Angeles	13 00 N.	94 30 W.	Mar. 15	4a, 15	Mar. 15	29.80	N	N, 7	NE	N, 8	N.
Seattle, Am.S.S.	Legaspi	San Francisco	32 30 N.	153 30 E.	Mar. 14	6a, 15	do.	29.49	S	S, 8	S	SW, 8	SW-S-SW.
Golden Dragon, Am.S.S.	Hondagua, P.I.	do.	35 56 N.	163 45 E.	Mar. 15	4a, 16	Mar. 16	29.62	S	S, 8	S	S, 9	None.
Bellingham, Am.S.S.	Taku Bar	Seattle	48 36 N.	174 30 E.	Mar. 17	9p, 17	Mar. 17	29.37	ESE	ESE, 8	ESE	ESE, 9	ESE-SE.
Aorangi, Br.M.S.	Honolulu	Victoria	37 14 N.	142 01 W.	Mar. 19	Mdt. 19	Mar. 19	29.68	WNW	NW, 6	NW	WNW, 9	None.
Brilliant, Am.M.S.	Los Angeles	Balboa	13 53 N.	95 54 W.	do.	4a, 20	Mar. 20	29.91	NE	NNE, 6	NNE	NNE, 8	Steady.
Tyndareus, Br.S.S.	Yokohama	Victoria	38 24 N.	145 54 E.	Mar. 22	10p, 21	Mar. 23	29.15	W	S, 7	WSW	W, 8	S-W.
Michigan, Am.S.S.	Manila	San Francisco	38 17 N.	168 18 E.	Mar. 23	2p, 23	do.	29.73	SSW	SSW, 8	SSW	S, 9	Steady.
Tamaha, Br.S.S.	Japan	Los Angeles	39 50 N.	157 12 W.	do.	do.	Mar. 24	29.22	NW	NW, 9	WNW	NW, 10	None.
Tyndareus, Br.S.S.	Yokohama	Victoria	48 13 N.	174 25 E.	Mar. 25	4a, 26	Mar. 26	28.87	SE	SW, 7	SW	SW, 9	SE-SW.
Michigan, Am.S.S.	Manila	San Francisco	40 55 N.	162 05 W.	Mar. 27	4a, 28	Mar. 28	29.94	NW	NW, 8	NW	NW, 9	None.
Minnesotan, Am.S.S.	Los Angeles	Balboa	13 06 N.	93 36 W.	Mar. 28	6p, 28	do.	29.91	NE	N, 6	N	NE, 8	None.
Hakonesan Maru, Jap.M.S.	Yokohama	Los Angeles	42 58 N.	160 18 E.	Mar. 30	1p, 31	Apr. 2	28.10	E	SSW, 8	W	SSW, 10	SSW-WSW.

<sup>1</sup> Position approximate.<sup>2</sup> Barometer uncorrected.

## NORTH PACIFIC OCEAN, MARCH 1934

By WILLIS E. HURD

**Atmospheric pressure.**—The average center of the Aleutian Low in March lay over or slightly to the southward of the Eastern Aleutians, as in the preceding February, but it was much shallower in depth, with average reading of 29.61 inches, at Dutch Harbor. Pressures were below normal in the Bering Sea and neighboring Pacific region, and above normal along the American west coast from the Peninsula of Alaska to Cape Corrientes, Mexico. Averages for other Pacific points were normal, or practically so, except at Manila, which was 0.09 below.

The region occupied by the normal high-pressure belt was subject this month to fluctuating barometric conditions because of numerous intruding depressions including extensions southward of the Aleutian Low. The crest of the North Pacific anticyclone lay off the upper coast of the United States, and a belt of moderately high pressure extended across the ocean in lower middle latitudes.

A rapid pressure change occurred at Tatoosh Island from 29.68 inches, the minimum reading of the month, on the 5th, to 30.57, the maximum reading, on the 7th. The lowest corrected barometer reading of the month noted on the North Pacific was 28.10 inches, reported by the Japanese motorship *Hakonesan Maru* near 43° N., 160° E., on the 31st.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, March 1934, at selected stations

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	<i>Inches</i>	<i>Inch</i>	<i>Inches</i>		<i>Inches</i>	
Point Barrow.....	30.18	+0.03	30.70	21	29.16	2
Dutch Harbor.....	29.61	— .09	30.18	17	28.64	8
St. Paul.....	29.69	— .04	30.28	17	29.04	8
Kodiak.....	29.83	+ .14	30.26	4, 22	28.74	1
Juneau.....	30.01	+ .07	30.55	7	28.70	1
Tatoosh Island.....	30.10	+ .14	30.57	7	29.68	5
San Francisco.....	30.09	+ .03	30.33	1	29.80	23
Mazatlan.....	29.94	+ .02	30.02	18	29.84	23, 24
Honolulu.....	30.02	— .02	30.17	1	29.87	25
Midway Island.....	30.07	.00	30.32	29	29.74	11
Guam.....	29.92	+ .02	30.00	1, 17	29.84	30
Manila.....	29.86	— .09	29.96	6, 7, 17	29.76	25, 26
Naha.....	30.00	.00	30.24	5	29.72	26
Chichishima.....	30.00	.00	30.28	18	29.76	13-15, 27
Nemuro.....	29.82	-----	30.36	11	28.66	21

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

**Cyclones and gales.**—Notwithstanding the considerable prevalence of cyclonic activity in higher and middle latitudes of the ocean, storminess was far less extensive and severe in March than in February. The only gale of the month reported in excess of force 10 was one of hurricane velocity experienced by the American steamer *Grays Harbor* on the 1st, near 51° N., 139° W., in connection with a deep disturbance then covering northeastern waters. The lowest barometer reported was 28.70 inches, which is practically identical with the lowest reading of the month that day at Kodiak and Juneau. Similarly low barometers were reported by ships near the center of a cyclone 200 miles south of Dutch Harbor on the 6th, accompanied by whole northeasterly gales.

Two moderately-intense cyclonic developments occurred during March between the Hawaiian Islands and the California coast. These caused strong gales between about 30° and 40° N., 135° and 145° W., on the 12th and 19th, and less rough weather on adjacent dates.

Altogether, winds of fresh to strong gale force are indicated as being comparatively infrequent, as well as scattered, over the region east of the 180th meridian.

With westward approach to far eastern waters the percentage of high winds showed a moderate increase over those in west longitudes, but gales were well distributed through the month, due in great measure to the successive regularity of cyclones moving eastward after originating in Asia or neighboring Pacific waters. One of the deepest of these cyclones appeared over the Japan Sea on the 20th. On the 21st, with the storm centered over Yezo and the southern Kurils, Nemuro reported a barometer reading of 28.66 inches. On this day fresh to strong gales occurred over the seas surrounding northern and central Japan. The storm thence moved northward, then eastward, and died out in the Bering Sea. The deepest storm of March occurred at the end of the month, when winds of whole gale force were experienced on the 31st, with barometer reported as low as 28.10 inches, near 43° N., 160° E.

**Tropical gales.**—A press account from Shanghai on the 29th, reported a typhoon over the southernmost seacoast province of China on the 26th which caused the destruction of 300 fishing junks and cost the lives of some 800 fishermen. The weather maps indicate the presence of a shallow low in the neighborhood on that date.

In the Gulf of Tehuantepec northers were more active in March than during any other month of the winter. They include a moderate gale (force 7) on the 12th, fresh gales (force 8) on the 14th, 15th, 20th, and 28th, and strong gales (force 9) on the 11th and 13th.

**Fog.**—Fog occurred on about 15 days along the coast of the Peninsula of California; on about 20 days along the California coast; and thence northward to Vancouver Island on about 6 days. Farther at sea fog was infrequent and scattered over small areas, and was not observed over the great body of the ocean.

## CLIMATOLOGICAL TABLES

### CONDENSED CLIMATOLOGICAL SUMMARY

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.